Ubiquinone reduction and protonation in photosynthetic reaction centres from *Rhodopseudomonas viridis*: X-ray structures and their functional implications
C.R.D. Lancaster (Germany) 143
Structural basis of functions of the mitochondrial cytochrome *bc*1 complex
C.-A. Yu, D. Xia, H. Kim, J. Deisenhofer, L. Zhang, A.M. Kachurin and L. Yu (USA) 151
Electron–proton interactions in terminal oxidases
M. Karpefors, P. Ädelroth, A. Aagaard, H. Sigurdson, M. Svensson Ek and P. Brzezinski (Sweden) 159
From water to oxygen and back again: mechanistic similarities in the enzymatic redox conversions between water and dioxygen
C.W. Hoganson, M.A. Pressler, D.A. Proshlyakov and G.T. Babcock (USA) 170
Improved isolation and crystallization of Photosystem I for structural analysis
P. Fromme and H.T. Witt (Germany) 175
Proton translocation by the respiratory haem–copper oxidases
M. Wikström (Finland) 185
Artificial photosynthesis: towards functional mimics of photosystem II?
L. Hammarström, L. Sun, B. Åkermark and S. Styring (Sweden) 193
Perspectives on the mitochondrial permeability transition
P. Bernardi, E. Basso, R. Colonna, P. Costantini, F. Di Lisa, O. Eriksson, E. Fontaine, M. Forte, F. Ichas, S. Massari, A. Nicolli, V. Petronilli and L. Scorrano (Italy, USA) 200
Higher plants light harvesting proteins. Structure and function as revealed by mutation analysis of either protein or chromophore moieties
D. Sandonà, R. Croce, A. Pagano, M. Crimi and R. Bassi (Italy) 207
Redox components and structure of the respiratory NADH:ubiquinone oxidoreductase (complex I)
T. Friedrich, A. Abelmann, B. Brors, V. Guénebaut, L. Kintscher, K. Leonard, T. Rasmussen, D. Scheide, A. Schlitt, U. Schulte and H. Weiss (Germany, USA) 215
Transcriptional regulation and energetics of alternative respiratory pathways in facultatively anaerobic bacteria
G. Unden (Germany) 220
Maintenance energy requirement: what is required for stasis survival of *Escherichia coli*?
T. Nyström and N. Gustavsson (Sweden) 225
The dynamic feature of the proton collecting antenna of a protein surface
V. Sacks, Y. Marantz, A. Aagaard, S. Checover, E. Nachliel and M. Gutman (Israel, Sweden) 232
Multiple proton-conducting pathways in cytochrome oxidase and a proposed role for the active-site tyrosine
R.B. Gennis (USA) 241
Mitochondrial respiration in the low oxygen environment of the cell. Effect of ADP on oxygen kinetics
E. Gnaiger, B. Lassnig, A.V. Kuznetsov and R. Margreiter (Austria) 249
Structure and dynamics of a proton shuttle in cytochrome *c* oxidase
R. Pomès, G. Hummer and M. Wikström (Finland, USA) 255
The chemistry and mechanics of ubihydroquinone oxidation at center P (Q_o) of the cytochrome bc_1 complex
U. Brandt (Germany) 261
Photosystem two
J. Barber (UK) 269
Biochemical and genetic controls exerted by plant mitochondria
L. McIntosh, T. Eichler, G. Gray, D. Maxwell, R. Nickels and Y. Wang (USA) 278
Quantitation of P840 reaction center preparations from *Chlorobium tepidum*: chlorophylls and FMO-protein
C. Griesbeck, C. Hager-Braun, H. Rogl and G. Hauska (Germany) 285
Electron transfer in proteins
S. Larsson (Sweden) 294
Structure–function studies of iron–sulfur clusters and semiquinones in the NADH–Q oxidoreductase segment of the respiratory chain
T. Ohnishi, V.D. Sled, T. Yano, T. Yagi, D.S. Burbaev and A.D. Vinogradov (Russian Federation, USA) 301
A novel pathway for cytochromes *c* biogenesis in chloroplasts
Z. Xie and S. Merchant (USA) 309
Fatty acid cycling mechanism and mitochondrial uncoupling proteins
P. Ježek, H. Engstová, M. Žáčková, A.E. Vercesi, A.D.T. Costa, P. Arruda and K.D. Garlid (Brazil, Czech Republic, USA) 319

Information for Contributors *vii*

Review

Adenosine 5′-triphosphate: an intracellular metabolic messenger
A. Szewczyk and S. Pikua (Poland) 333

Regular papers

Reaction centre photochemistry in cyanide-treated photosystem II
Y. Deligiannakis and A.W. Rutherford (France) 354

Detection of threonine structural changes upon formation of the M-intermediate of bacteriorhodopsin: evidence for assignment to Thr-89
X. Liu, M.J. Lee, M. Coleman, P. Rath, A. Nilsson, W.B. Fischer, M. Bizounok, J. Herzfeld, W.F.J. Karstens, J. Raap, J. Lugtenburg and K.J. Rothschild (The Netherlands, USA) 363

The triplet state of the FMO complex of the green sulfur bacterium *Prosthecochloris aestuarii* studied with single-crystal EPR
R.J.W. Louwe, T.J. Aartsma, P. Gast, R.J. Hulsebosch, H.M. Nan, J. Vrieze and A.J. Hoff (The Netherlands) 373

Induction of the mitochondrial permeability transition by *N*-ethylmaleimide depends on secondary oxidation of critical thiol groups. Potentiation by copper-*ortho*-phenanthroline without dimerization of the adenine nucleotide translocase
P. Costantini, R. Colonna and P. Bernardi (Italy) 385

Paracoccus denitrificans cytochrome *c* oxidase: a kinetic study on the two- and four-subunit complexes
F. Nicoletti, H. Witt, B. Ludwig, M. Brunori and F. Malatesta (Germany, Italy) 393

Triplet energy transfer in bacterial photosynthetic reaction centres
A. Angerhofer, F. Bornhäuser, V. Aust, G. Hartwich and H. Scheer (Germany, USA) 404

The cbb_3-type cytochrome *c* oxidase from *Rhodobacter sphaeroides*, a proton-pumping heme-copper oxidase
M. Toledo-Cuevas, B. Barquera, R.B. Gennis, M. Wikström and J.A. Garcia-Horsman (Finland, Mexico, USA) 421

Stopped-flow kinetic studies of low potential electron carriers of the photosynthetic bacterium, *Rhodobacter capsulatus*: ferredoxin I and NifF
P.C. Hallenbeck and G. Gennaro (Canada) 435

Essential structural factors of annonaceous acetogenins as potent inhibitors of mitochondrial complex I
H. Miyoshi, M. Ohshima, H. Shimada, T. Akagi, H. Iwamura and J.L. McLaughlin (Japan, USA) 443

Oxygen permeability of thylakoid membranes: electron paramagnetic resonance spin labeling study
A. Ligeza, A.N. Tikhonov, J.S. Hyde and W.K. Subczynski (Poland, Russian Federation, USA) 453

Effect of truncation and mutation of the carboxyl-terminal region of the β subunit on membrane assembly and activity of the pyridine nucleotide transhydrogenase of *Escherichia coli*
P.D. Bragg and C. Hou (Canada) 464

Loss of inhibition by formate in newly constructed photosystem II D1 mutants, D1-R257E and D1-R257M, of *Chlamydomonas reinhardtii*
J. Xiong, J. Minagawa, A. Crofts and Govindjee (Japan, USA) 473

Two regions of the Mn-stabilizing protein from *Synechococcus elongatus* that are involved in binding to photosystem II complexes
A. Motoki, T. Shimazu, M. Hirano and S. Katoh (Japan) 492

Determination of mitochondrial creatine kinase fluxes in intact heart mitochondria using ^{31}P-saturation transfer nuclear magnetic resonance spectroscopy
D. Jahnke, M.L.H. Gruwel and S. Soboll (Canada, Germany) 503

Flash-induced changes in buffering capacity of reaction centers from photosynthetic bacteria reveal complex interaction between quinone pockets
L. Kálmán, P. Sebban, D.K. Hanson, M. Schiffer and P. Maróti (France, Hungary, USA) 513

Interactions between bioenergetics and mitochondrial biogenesis
S.C. Leary, B.J. Battersby, R.G. Hansford and C.D. Moyes (Canada, USA) 522

The two spectroscopically different short wavelength protochlorophyllide forms in pea epicotyls are both monomeric
B. Böddi, K. Kis-Petik, A.D. Kaposi, J. Fidy and C. Sundqvist (Hungary, Sweden) 531

Short sequence-papers

Extraordinary features in the *Chlamydomonas reinhardtii* chloroplast genome: (1) rps2 as part of a large open reading frame; (2) a *C. reinhardtii* specific repeat sequence
S. Leu (Israel) 541

A phylogenetic analysis of the cytochrome *b* and cytochrome *c* oxidase I genes supports an origin of mitochondria from within the Rickettsiaceae
T. Sicheritz-Pontén, C.G. Kurland and S.G.E. Andersson (Sweden) 545

Cumulative Contents, Vol. 1365 552

Author Index 555